

1 **Abstract**

2 A key problem associated with most types of separators based upon use of centrifugal forces is
3 the difficulty such devices have with making absolute measurements of particle size and/or
4 molar mass. By integrating means to produce and detect light scattered from samples undergoing
5 centrifugal separation, particle sizes in the sub-micrometer range may be extracted from such
6 measurements even in the presence of diffusion. The integration of light scattering detectors into
7 an environment of high speed machinery is achieved by modifying the transparent surfaces of the
8 sample holding region of the centrifuge. Such optical modifications allow the placement of
9 stationary detector arrays able to collect light scattered by the samples during the brief collection
10 times available. Three specific structures are addressed: A conventional disk centrifuge with a
11 sample cavity integrated into the rotating structure; a disk centrifuge containing removable
12 sample holding cuvettes, and an analytical ultracentrifuge. Modifications to the analytical
13 ultracentrifuge permit the direct determination of molecular mass resulting, thereby, in the ability
14 to measure molecular displacement volumes and all associated quantities directly.